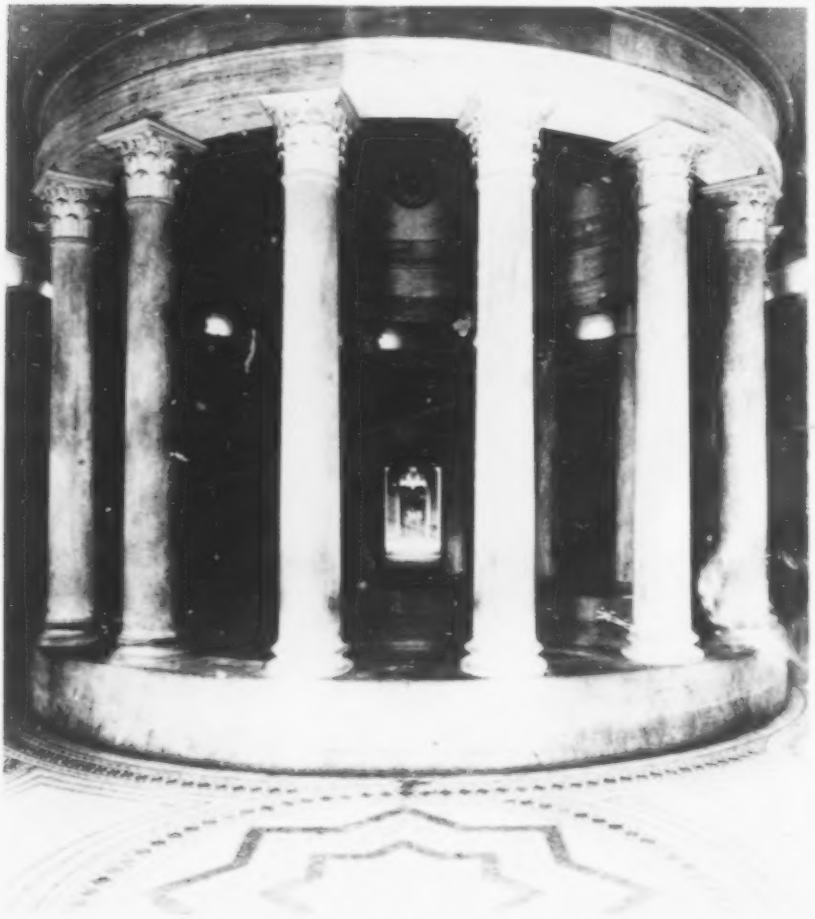
Office of Technology Assessment



Annual Report to the Congress

Fiscal Year 1990

J952-15

About The Report

The Office of Technology Assessment is an analytical support agency of the United States Congress. OTA works directly with and for the Committees of Congress, providing them with objective, thorough analysis of technological issues. This report to Congress is required under Sec. 11 of the Technology Assessment Act of 1972, Public Law 92-484. It describes the activities of the Office in Fiscal Year 1990 within the context of the legislative agenda of the 101st Congress and the events in the United States and the world during 1990.

**Cover photo—Hall of Columns, U.S. Capitol*

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Chairman's Statement

The past year has been characterized by enormous changes and challenges across the globe. But while public attention necessarily focuses on the crisis in the Persian Gulf and the extraordinary events unfolding in the Soviet Union, Eastern Europe, and Germany, other profound developments are occurring in less visible ways: in the tropical rain forests and the polar ice caps, in the micro-manipulation of genetic material and the microprocessing of optical impulses, and in innumerable other areas of environmental change and scientific and technological progress.

Congress perforce must focus on the immediate challenges inundating the Nation. But it also must be prepared to deal with the next wave of challenges and the ones coming after that. That was why we created OTA in 1972: to provide Congress with advance notice and analysis of the positive and negative aspects of impending technological developments—and to delineate the pros and cons of the policy options for responding to them.

OTA has been fulfilling this task in an exemplary fashion, as evidenced by this past, highly productive year. In fiscal year 1990, OTA released 15 major assessment reports, along with 45 more specialized reports, and presented testimony at 49 congressional hearings. The scope and significance of OTA's contributions may be illustrated by several examples.

OTA's report, *Linking for Learning: A New Course for Education*, provides Congress with valuable options for utilizing technology to chart a new course for American education. The report entitled *Worker Training: Competing in the New International Economy* depicts the connections between workplace technology, worker training, and international competitiveness. The report compares U.S. investment in training with that of its competitors, along with the relative skill levels of their respective workforces; and provides Congress with a range of policy options for improving U.S. performance. And the OTA report, *Genetic Witness: Forensic Uses of DNA Tests*, has become the leading text in that rapidly developing field of law enforcement.

These few examples illustrate the variety of high-quality OTA reports this year that have contributed to congressional understanding and decisionmaking on complex issues involving technology. As a founder and first Chairman of OTA, I can attest to the fact that the agency has indeed fulfilled the expectations we evinced at its establishment.

SENATOR EDWARD M. KENNEDY

Vice Chairman's Statement

It has been my great pleasure to serve as Vice Chairman of the Technology Assessment Board.

More than ever, our Nation's economic well-being depends on our technology policy. Historically, technology has always been one of the chief advantages that the United States has over its economic competitors. Our scientists and engineers gave us innovation, and in turn these innovations made our economy a thriving one.

This can still be the case. With a wise and well-designed technology policy, the United States can maintain a healthy economy, and meet the new century in a strong competitive position.

I believe that OTA can play a critical role in that process. More than ever, the Congress will need sound advice on science and technology. Over the past few years, OTA has matured as an institution. It gives the Congress a reasonable and sober evaluation of complicated issues, and helps point the way to wiser policymaking.

I look forward to the decade ahead, and to a continuing association with this fine agency.

CONGRESSMAN CLARENCE E. MILLER

TAAC Chairman's Statement

It has been my distinct pleasure to assume the Chair of the Technology Assessment Advisory Council this year.

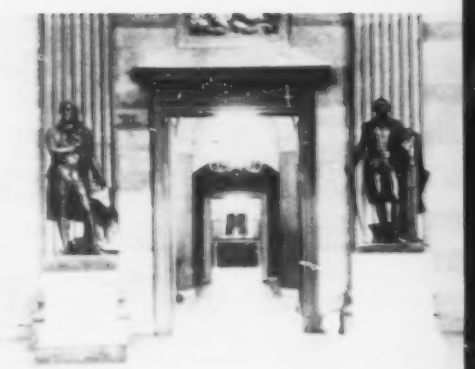
I believe this is an important and exciting crossroads in OTA's history. Over the past decade, OTA has matured into an organization of impressive strength, one which is better able than ever to serve as an adviser to Congress. OTA has achieved this stature by avoiding any major mistakes, while developing an impressive reputation for quality and reliability despite the controversy and complexity surrounding the issues it has addressed.

It is my hope in the future that OTA will continue on this path, with particular attention to the major, overarching issues that face the Nation. The United States faces major choices and obstacles in such fields as health care, education, energy, economic competitiveness, and the environment, just to name a few. Because Congress had developed an agency with a rare ability to synthesize large complex public policy issues, OTA's unique capabilities should be utilized by the Congress to look at the "big picture." None of our policy dilemmas exist in a vacuum: education affects competitiveness, which impacts the cost of health care. While OTA should not expand in size, the size of its targets should.

I look forward to the coming year, the beginning of a critical decade for our Nation's history. If that history is a guide, technology policy will be a critical factor in our future success or failure.

CHASE N. PETERSON

Years ago, as a bench physicist, I spent a lot of time tracking down clues about the elements that make up our solar system. It was a fascinating adventure that helped confirm the hypothesis that the earth's material came from the very "heart" of a star. The star slowly evolved over hundreds of millions of years, but then ended its own life in a supernova—a massive explosion. The "natural" radioactivity that is around more than 4 billion years later is convincing evidence of that ancient, cataclysmic event.



Many lessons come from such scientific studies, but two are very appropriate for this brief essay. First, history—whether it be astronomical or human—does not unfold smoothly. It can be influenced profoundly and even dominated by rare, sudden and traumatic events. We find it easier to think and analyze things in terms of slow, incremental change but, however important that kind of change may be, it is insufficient when dealing with reality.

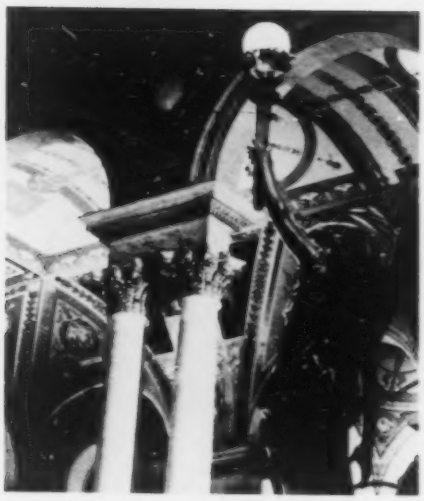
The second lesson is that it can be very difficult to anticipate sudden change. In astrophysics, we now understand the evolution and fate of stars. However, sudden physical events are vastly easier to predict than predicting sudden *human* events. Because human events are increasingly driven by technology change OTA must understand where technology is going. Knowing how technology interacts with human society is essential if one hopes to anticipate or affect the outcome of change, whether it be gradual or sudden.

In 1789, Madison wrote to Jefferson, "We are in a wilderness without a single footstep to guide us. Future generations will have an easier time." Today, we have more footsteps to guide us than did our Founding Fathers—lessons of historical precedents, insights of knowledge, and power of analysis such as that which OTA strives to provide. The coming year will undoubtedly be filled with extraordinary events, including some that will try our national spirit and our commitments to future generations, so it is crucial to identify and evaluate options from which wise choices can be made.

OTA will continue to function as a shared analytical staff of diverse experts focusing our energies on understanding highly complex and controversial scientific and technological issues; we will contribute to resolving discrepancies and inconsistencies; and we will identify alternative ways to solve problems. OTA's success evolves from insistence on fully understanding the issues—technical, economic, social, ethical, political. We identify and incorporate the perspectives of the stakeholders. We stipulate the issues that have reached consensus, and we delineate options for policymakers.

OTA is needed in the legislative branch because it fills a critical communication gap between specialists and policymakers. OTA reduces the shadow cast by technical uncertainty and disagreement among experts. OTA distills and translates technical information for laymen and then steps back to witness the exquisite process of debate, negotiation, and resolution within Congress.

JOHN H. GIBBONS



Created by the Technology Assessment Act of 1972 [86 Stat. 797], OTA is an agency of the legislative branch of the Federal Government (a copy of the Act is found on p. 35). OTA's primary function is to provide congressional committees with assessments or studies that identify the range of likely positive and negative consequences, social as well as physical, of policy alternatives affecting the uses of technology.

In providing assistance to Congress, OTA identifies: existing or probable impacts of technology or technological programs; alternative technological methods and management programs for implementing specific actions (estimating and comparing the impacts of alternatives); and areas where additional research or data collection is required to provide support for assessments. Finally, we present findings of completed analyses to the appropriate legislative authorities and, whenever possible, undertake such additional associated activities as may be necessary.

The Act provides for a bipartisan Technology Assessment Board, a director, and such other employees and consultants as may be necessary to conduct the Office's work. The congressional board is made up of six Senators, appointed by the President pro tempore of the Senate, and six Representatives, appointed by the Speaker of the House, evenly divided by party. In 1990, Sen. Edward H. Kennedy (D-Massachusetts) and Rep. Clarence Miller (R-Ohio) served as the Chairman and Vice Chairman, respectively, of the board. The two posts alternate between the Senate and House with each Congress. The board members from each Chamber select their respective officer.

The congressional board sets the policies of the Office and is the sole and exclusive body governing OTA. The board appoints the director, who is OTA's chief executive officer and a nonvoting member of the board.

The Act also calls for a Technology Assessment Advisory Council composed of 10 public members eminent in scientific and technological fields, the Comptroller General of the United States, and the Director of the Congressional Research Service of the Library of Congress. The advisory council advises the board and the director on such matters as the balance, comprehensiveness, and quality of OTA's work, and OTA's nongovernmental resources.

Requests for OTA assessments may be initiated by:

- the chairman of any standing, special, select, or joint committee of Congress, acting alone, at the request of the ranking minority member, or at the request of a majority of the committee members;
- the OTA board; or
- the OTA director, in consultation with the board.

The authorization of specific assessment projects and the allocation of funds for their performance are the responsibilities of the OTA board.

The analytical work of the Office is organized into three divisions, each headed by an assistant director. They encompass assessments grouped in the areas of energy and materials; international security and commerce; industry, technology, and employment; biological applications; food and renewable resources; health; communication and information technologies; oceans and environment; and science, education, and transportation.

Staff of the Operations Division supports the analytical work of the Office. These offices—Administrative Services, Contracts, Budget and Finance, Information Center, Personnel, Publishing, and Telecommunications and Information Systems—provide the research staff and management with a variety of services and technologies vital to successful functioning of the Office. The Information Center also provides public access to the full collection of OTA publications, including an online index, and the Publications Office within Publishing handles public dissemination of OTA reports. The Congressional and Public Affairs Office staff play a critical role in the Office by assisting in coordinating OTA's work with various committees of the House and Senate, providing effective communications between OTA management and staff and the Technology Assessment Board and Technology Assessment Advisory Council, and by assuring wide dissemination of OTA's publications on Capitol Hill and to the press. (General Information on OTA and availability of OTA publications is listed on the inside back cover.)

Accomplishments in FY1990

Fiscal year 1990 represented a time of great change in the world and in the United States. The fall of the Iron Curtain was followed by the extraordinary demise of centrally planned governments in the U.S.S.R. and Eastern Europe. This major world event was driven by the irresistible force of technology change, which has revolutionized the world's economy. Over the past 5 years OTA studies of the impacts of technology on the economy, environment and security have made it clear that this revolution was inevitable.

But OTA has also shown that, however unpleasant and unpopular it is to confront, our own economic system is in trouble. We are spelling out not only the challenge to stay competitive and successful in tomorrow's world, but also indentifying specific ways to success. That task consumes a major portion of our work. It ranges from START verification studies to ways to strengthen our workers to compete for jobs in a global economy.

The Iraqi invasion of Kuwait brought in a new conflict strongly linked to energy resources but complicated by the availability of Western arms and technology. While OTA did not predict these events, much of our work—completed and ongoing—is directly relevant to understanding what to do about it and how to avoid such situations in the future. Our studies of international defense technology cooperation and the flow of arms are directly relevant. Our detailed analyses of energy supply and demand have provided new insight into the murky world of energy strategic studies, inducing ways to wean ourselves from our overdependence on Middle East oil through diversification of energy sources and greatly increased efficiency of use, via advanced technology. However the present conflict plays out, these issues will be the heart of informed decision making about our Nation's future economy, environment and security.

During FY1990, OTA delivered 45 formal publications to Congress, including assessment reports, special reports, and several background papers. As of September 30, 1990, 36 approved studies were in progress. As an integral part of carrying out assessments, OTA also provided, during the course of projects as well as after delivery, expert advice, briefings, testimony, and results of OTA assessments to Committees matched to their specific needs and the congressional agenda.

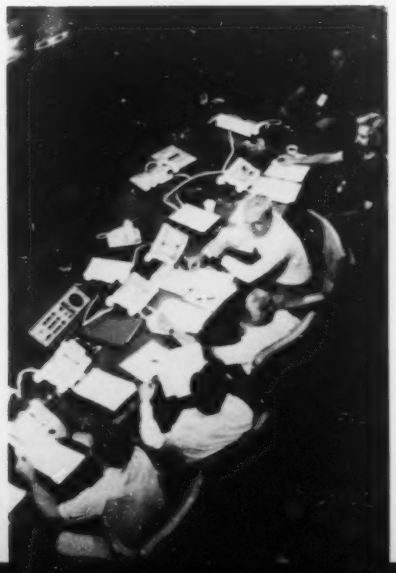
OTA served over 50 different Committees and Subcommittees of both Houses, typically in response to bipartisan requests.

Energy, Materials, and International Security Division

The Division comprises three programs: Energy and Materials; Industry, Technology, and Employment; and International Security and Commerce.

The Energy and Materials Program is responsible for assisting Congress in understanding the technological possibilities for developing our energy and materials resources and the consequences of these developments for society. OTA's Energy and Materials Program covers those technologies that concern the extraction, delivery, and use of energy and materials, in addition to focusing attention on world markets and policies, including imports and exports of energy and materials.

The Industry, Technology, and Employment Program examines how technology affects the ability of U.S. industry to contribute to a healthy national economy. Its responsibilities include consideration of the competitiveness of U.S. industries in international markets, trade and economic development issues, the number and nature of employment opportunities, needs for worker education, training and retraining, and ways to ease adjustment in structural economic transitions. A Program with a specific employment focus is new at OTA (the Program was established in 1983), although most assessments have considered employment impacts, and employment and training issues have been of central importance in several studies. This section of the program centers on the quantity, nature, and quality of jobs, the nature of and changes in job skills, and training and retraining across the work force.



OTA's analyses of issues of national defense, international security, and space are conducted primarily by the International Security and Commerce Program. In recent years this has included: defense industry and technology, aspects of defense management, international collaboration, space transportation, orbital debris, nuclear offense and defense, arms control, export controls, NATO defensive strategy, terrorism, and commercial uses of space. The multi-disciplinary staff—including scientists, engineers, social scientists, and others—brings a broad perspective to these and other complex problems.

ACCOMPLISHMENTS IN FY1990

The Division contributed considerably to the debate on major issues in the 101st Congress. Its work in energy-related issues affected the deliberations on alternative fuels provisions in the Clean Air Act, and work on automotive fuel economy directly affected legislative consideration of CAFE standards. The ongoing project updating a 1984 study on U.S. vulnerability of an oil import curtailment has provided critical background information for Congress during the current Middle East crisis.

Environmental work in the area of waste reduction and Superfund has continued to assist Congress in understanding hazardous waste and cleanup concerns. Work on manufacturing and the economy has provided critical information for Congress on the need for the development and diffusion of commercially important technologies, and OTA's assessment of worker training has been used extensively by Committee staff in drafting legislation focusing on technological training and education for America's workers to help them compete in the global economy.

Finally, the Division's work in international security and space has broadened the debate in Congress. Studies directed at defense technology were essential to Committee staff in drafting the defense authorization bills and the Defense Production Act. OTA's study on seismic verification of nuclear testing influenced the deliberations which finally ratified the 1974 Treaty with the U.S.S.R. on Limitation of Underground Nuclear Weapons Tests (the Threshold Test Ban Treaty). And studies on space technology have been critical in assisting Congress in evaluating future investment in space exploration.

HIGH-TEMPERATURE SUPERCONDUCTIVITY IN PERSPECTIVE (R), MAY 1990
Requested by:
Senate Committee on Energy and Natural Resources
Senate Committee on Governmental Affairs
Senate Committee on Commerce, Science, and Transportation and the Subcommittee on Science, Space, and Technology
House Committee on Science, Space, and Technology

PHYSICAL VULNERABILITY OF ELECTRIC SYSTEMS TO NATURAL DISASTERS AND SABOTAGE (R), JUNE 1990
Requested by:
Senate Committee on Governmental Affairs

ENERGY USE AND THE U.S. ECONOMY (BP), JUNE 1990
Requested by:
House Committee on Energy and Commerce, Subcommittee on Energy and Power

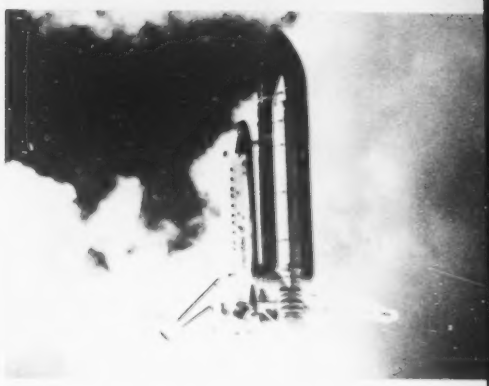
THE ROYALTY MANAGEMENT PROGRAM'S AUDITING AND FINANCIAL SYSTEM (BP), JULY 1990
Requested by:
Senate Committee on Energy and Natural Resources

NONFERROUS METALS: INDUSTRY STRUCTURE (BP), SEPTEMBER 1990
Requested by:
Senate Committee on Energy and Natural Resources, Subcommittee on Mineral Resources Development and Production

REPLACING GASOLINE: ALTERNATIVE FUELS FOR LIGHT-DUTY VEHICLES (SR), SEPTEMBER 1990
Requested by:
House Committee on Energy and Commerce
Senate Committee on Energy and Natural Resources

COMING CLEAN: SUPERFUND PROBLEMS CAN BE SOLVED (R), OCTOBER 1989
Requested by:
House Committee on Public Works and Transportation and the Subcommittee on Investigations and Oversight
House Committee on Energy and Commerce and the Subcommittee on Transportation, Tourism, and Hazardous Materials
House Committee on Government Operations and the Subcommittee on Environment, Energy, and Natural Resources
Senate Committee on Environment and Public Works and the Subcommittee on Superfund and Environmental Oversight

MAKING THINGS BETTER: COMPETING IN MANUFACTURING (R), FEBRUARY 1990
Requested by:
Senate Committee on Finance and the Subcommittee on International Finance and Monetary Policy
Senate Committee on Banking, Housing, and Urban Affairs
House Committee on Banking, Finance, and Urban Affairs



WORKER TRAINING: COMPETING IN THE NEW INTERNATIONAL ECONOMY (R), SEPTEMBER 1990
Requested by:
House Committee on Education and Labor
Senate Committee on Labor and Human Resources
Senate Committee on Finance

THE CONTAINMENT OF UNDERGROUND NUCLEAR EXPLOSIONS (SR), OCTOBER 1989
Requested by:
House Committee on Interior and Insular Affairs
Senator Orrin G. Hatch, as a member of the Technology Assessment Board

AFFORDABLE SPACECRAFT: DESIGN AND LAUNCH ALTERNATIVES (BP), FEBRUARY 1990
Requested by:
House Committee on Science, Space, and Technology
Senate Committee on Commerce, Science, and Transportation

ACCESS TO SPACE: THE FUTURE OF U.S. SPACE TRANSPORTATION SYSTEMS (R), APRIL 1990
Requested by:
House Committee on Science, Space, and Technology
Senate Committee on Commerce, Science, and Transportation

ARMING OUR ALLIES: COOPERATION AND COMPETITION IN DEFENSE TECHNOLOGY (SR), MAY 1990
Requested by:
Senate Committee on Armed Services
House Committee on Government Operations

Prior to July 1, 1990, OTA produced several categories of documents (i.e., Reports, Special Reports, Technical Memoranda, Background Papers, Case Studies, Workshop Proceedings, and Staff Papers). This list is inclusive of the various types of documents.

The Division comprises three programs: Biological Applications; Food and Renewable Resources; and Health.

The Biological Applications Program assesses state-of-the-art technologies arising from the cutting edge of biological science. Within its broad responsibility to assist Congress in understanding biomedical technologies, the Program explores possible consequences of those technologies and their applications on society, government, the economy, ethics, and the law.

The Food and Renewable Resources Program assesses national and international agriculture-related technologies used to provide society with food, fiber, and chemicals; technologies that affect the ability to sustain in perpetuity the renewable resource base that makes such production possible; and other technologies that affect the provision of environmental services derived from renewable resource systems. In addition, the Program has extensive experience in these fields as they relate to problems of developing countries.

The Health Program's charter is reflected in three primary types of efforts: 1) assessments of clinical and general health care technologies and related policy areas; 2) assessments in the area of environmental and occupational health; and 3) collaboration with, and assistance to, other OTA programs on health-related issues. The Program's responsibilities also include mandated reviews of protocols for studies of Agent Orange and of health effects among military personnel exposed to atomic bomb tests.

ACCOMPLISHMENTS IN FY1990

The Health and Life Sciences Division, with its broad range of jurisdiction, contributed heavily to congressional consideration of issues in the 101st Congress. The new technologies involved in genetic forensics were evaluated, and the resulting report served as valuable background to Congress in developing legislation. OTA's work on the needs of persons with dementia and Alzheimer's disease has been essential in assisting Committees to draft legislation on long-term care.

The 1990 Farm Bill was one of the most heavily debated in the 101st Congress, and OTA's reports and ongoing assessments on the state of American agriculture played an integral part in educating legislators in the complex issues involved. Our work in international agricultural issues were critical in funding various U.S. Agency for International Development programs, especially in its Office of Foreign Disaster Assistance.

And the OTA Health Program broadened its scope this year with major assessments of rural health care and adolescent health care, two studies affecting the quality of medical care for millions of Americans. Its ongoing work on various aspects of the AIDS crisis have been essential in keeping legislators informed on this most critical of health care issues.

NEUROTOXICITY: IDENTIFYING AND CONTROLLING POISONS OF THE NERVOUS SYSTEM (R), APRIL 1990
Requested by:
House Committee on Appropriations
House Committee on Science, Space, and Technology
Senate Committee on Commerce, Science, and Transportation, Subcommittee on Science, Technology, and Space

GENETIC WITNESS: FORENSIC USES OF DNA TESTS (R), JULY 1990
Requested by:
Senate Committee on Labor and Human Resources

CONFUSED MINDS, BURDENED FAMILIES: FINDING HELP FOR PEOPLE WITH ALZHEIMER'S AND OTHER DEMENTIAS (R), JULY 1990
Requested by:
Senate Committee on Labor and Human Resources
House Committee on Energy and Commerce and the Subcommittee on Health and the Environment

AGRICULTURAL RESEARCH AND TECHNOLOGY TRANSFER POLICIES FOR THE 1990s (SR), MARCH 1990
Requested by:
Senate Committee on Agriculture, Nutrition, and Forestry
House Committee on Agriculture

BENEATH THE BOTTOM LINE: AGRICULTURAL APPROACHES TO REDUCE AGRICHEMICAL CONTAMINATION OF GROUNDWATER (R), MAY 1990
Requested by:
House Committee on Agriculture, Subcommittee on Department Operations, Research, and Foreign Agriculture
House Committee on Science, Space and Technology
House Committee on Public Works and Transportation
House Committee on Government Operations, Subcommittee on Environment, Energy, and Natural Resources
House Committee on Interior and Insular Affairs, Subcommittee on Water and Power Resources
Senate Committee on Agriculture, Nutrition, and Forestry

FOREST SERVICE PLANNING: SETTING STRATEGIC DIRECTION UNDER RPA (SR), JULY 1990
Requested by:
House Committee on Agriculture
House Committee on Interior and Insular Affairs, Subcommittee on National Parks and Public Lands
Senate Committee on Agriculture, Nutrition, and Forestry

A PLAGUE OF LOCUSTS (SR), JULY 1990
Requested by:
Senate Committee on Appropriations, and its Subcommittee on Foreign Operations

RURAL EMERGENCY MEDICAL SERVICES (SR), NOVEMBER 1989
Requested by:
Senate Rural Health Caucus

INDIAN ADOLESCENT MENTAL HEALTH (SR), JANUARY 1990
Requested by:
Senate Select Committee on Indian Affairs

PREVENTIVE SERVICES FOR MEDICARE BENEFICIARIES: POLICY & RESEARCH ISSUES (SR), FEBRUARY 1990
Requested by:
House Committee on Ways and Means
Senate Committee on Labor and Human Resources

THE COSTS AND EFFECTIVENESS OF CERVICAL CANCER SCREENING IN ELDERLY WOMEN (BP), FEBRUARY 1990
Requested by:
House Committee on Ways and Means
Senate Committee on Labor and Human Resources

RECOMBINANT ERYTHROPOIETIN: PAYMENT OPTIONS FOR MEDICARE (SR), MAY 1990
Requested by:
House Committee on Ways and Means, Subcommittee on Health

OTA REVIEW OF REPORT TO SECRETARY OF DEPARTMENT OF VETERANS AFFAIRS ON ASSOCIATION BETWEEN ADVERSE HEALTH EFFECTS AND EXPOSURE TO AGENT ORANGE (BP), JULY 1990
Requested by:
House Committee on Veterans Affairs
Senate Committee on Veterans Affairs

THE EFFECTIVENESS OF DRUG ABUSE TREATMENT: IMPLICATIONS FOR CONTROLLING AIDS/HIV INFECTION (BP), SEPTEMBER 1990
Requested by:
Technology Assessment Board
House Committee on Appropriations, Subcommittee on Legislative

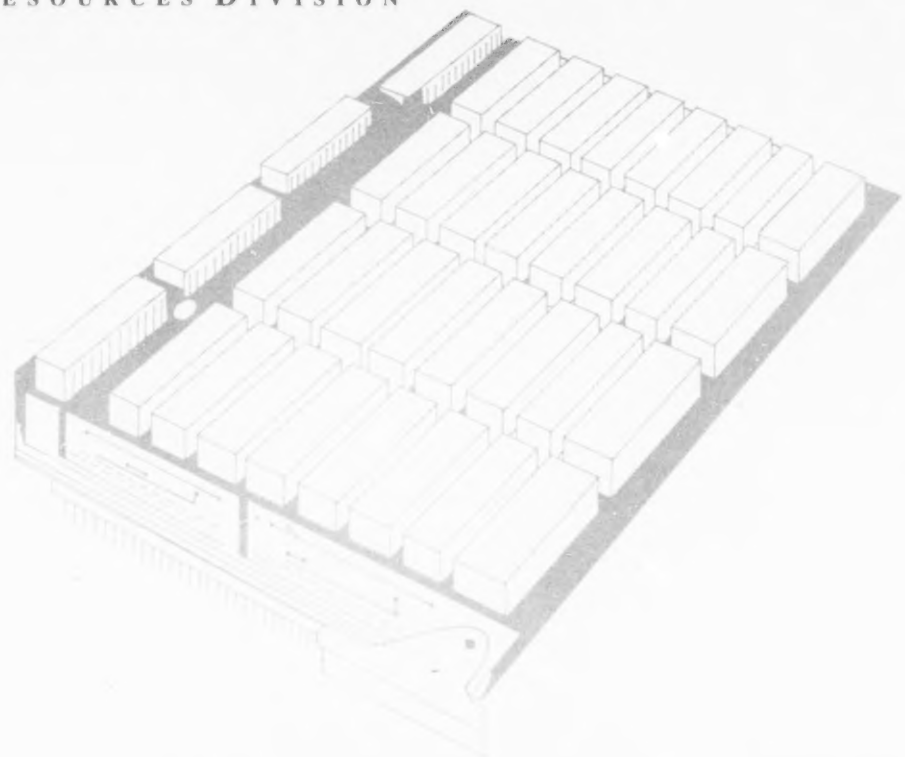
COSTS AND EFFECTIVENESS OF COLORECTAL CANCER SCREENING IN THE ELDERLY (BP), SEPTEMBER 1990
Requested by:
House Committee on Ways and Means
Senate Committee on Labor and Human Resources

HEALTH CARE IN RURAL AMERICA (R), SEPTEMBER 1990
Requested by:
Senate Rural Health Caucus

UNCONVENTIONAL CANCER TREATMENTS (R), SEPTEMBER 1990
Requested by:
House Committee on Energy and Commerce

Prior to July 1, 1990, OTA produced several categories of documents (i.e., Reports, Special Reports, Technical Memoranda, Background Papers, Case Studies, Workshop Proceedings, and Staff Papers). This list is inclusive of the various types of documents.

Science, Information, and Natural Resources Division



The Division comprises three programs: Communication and Information Technologies; Oceans and Environment; and Science, Education, and Transportation.

OTA's Communication and Information Technologies Program is responsible for assisting Congress in developing national policies related to telecommunications, information, microelectronics, software, and computer technologies. The core responsibilities of the Program require monitoring the research and development of new information technologies and assessing the technological state-of-the-art in these areas as well as trends in basic research and development.

The Oceans and Environment Program is responsible for all ocean-related questions, including ocean resources and maritime policy, and for large-scale environmental issues, such as climate modification and water pollution. The work of the Program usually falls under one of five basic categories: Federal services, natural resources, pollution control, marine industry, and large-scale environmental issues.

The Science, Education, and Transportation Program is responsible for work on a variety of topics, ranging from the traditional technology assessment issue of transportation to the newer issues of science policy and education. Science policy considers the health of the U.S. scientific enterprise, as well as allocation and decision-methods available to the Congress to support and manage research. Education work concentrates on schools but includes non-school delivery systems as well, and normally focuses on the use of technology to enhance learning.

ACCOMPLISHMENTS IN FY1990

The diversified nature of the subjects which the Division covers made it particularly useful in the legislative process of the 101st Congress. Assessing such controversial topics as stock market information technologies and copyright and home copying ensured its place in the congressional debate.

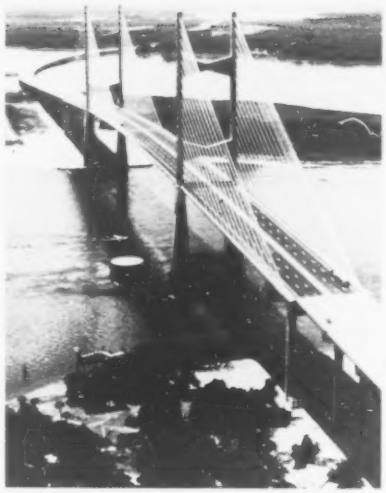
The Division also tackled some of the most critical environmental issues facing America today, especially in its ongoing assessment of climate modification and global warming. Its studies on solid waste management and marine waste have been critical in development of legislation.

Finally, the Division has contributed heavily to the debate on the use of educational technology and the importance of science education at all levels. Its ongoing assessment of the public works infrastructure will have far-ranging impact on congressional consideration of transportation and public works issues in the 102d Congress.

HIGH PERFORMANCE COMPUTING AND NETWORKING FOR SCIENCE (BP), OCTOBER 1989
Requested by:
House Committee on Science, Space, and Technology
Senate Committee on Commerce, Science, and Transportation

COPYRIGHT AND HOME COPYING: TECHNOLOGY CHALLENGES THE LAW (R), OCTOBER 1989
Requested by:
House Committee on the Judiciary and the Subcommittee on Courts, Civil Liberties, and Administration of Justice
Senate Committee on the Judiciary and the Subcommittee on Patents, Copyrights, and Trademarks

CRITICAL CONNECTIONS: COMMUNICATION FOR THE FUTURE (R), JANUARY 1990
Requested by:
House Committee on Energy and Commerce



COMPUTER SOFTWARE AND INTELLECTUAL PROPERTY (BP), MARCH 1990
Requested by:
House Committee on the Judiciary, Subcommittee on Courts, Intellectual Property, and the Administration of Justice

THE BIG PICTURE: HDTV AND HIGH-RESOLUTION SYSTEMS (BP), JUNE 1990
Requested by:
Rep. George E. Brown; as a member of the Technology Assessment Board

TRADING AROUND THE CLOCK: GLOBAL SECURITIES MARKETS AND INFORMATION TECHNOLOGY (BP), JULY 1990
Requested by:
House Committee on Government Operations and the Subcommittee on Commerce, Consumer, and Monetary Affairs
House Committee on Energy and Commerce

HELPING AMERICA COMPETE: THE ROLE OF FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION (SR), JULY 1990
Requested by:
House Committee on Science, Space, and Technology

ELECTRONIC BULLS AND BEARS: U.S. SECURITIES MARKETS AND INFORMATION TECHNOLOGY (R), SEPTEMBER 1990
Requested by:
House Committee on Government Operations and the Subcommittee on Commerce, Consumer, and Monetary Affairs
House Committee on Energy and Commerce

FACING AMERICA'S TRASH: WHAT NEXT FOR MUNICIPAL SOLID WASTE (R), OCTOBER 1989
Requested by:
House Committee on Energy and Commerce, Subcommittee on Transportation, Tourism, and Hazardous Materials
Senate Committee on Environment and Public Works, and the Subcommittee on Hazardous Wastes and Toxic Substances

PARTNERSHIPS UNDER PRESSURE: MANAGING LOW-LEVEL RADIOACTIVE WASTE (R), NOVEMBER 1989
Requested by:
Senate Committee on Environment and Public Works

COPING WITH AN OILED SEA: AN ANALYSIS OF OIL SPILL RESPONSE TECHNOLOGIES (BP), MARCH 1990
Requested by:
Sen. Ted Stevens, as a member of the Technology Assessment Board
House Committee on Merchant Marine and Fisheries, Subcommittee on Coast Guard and Navigation

LINKING FOR LEARNING: A NEW COURSE FOR EDUCATION (SR), NOVEMBER 1989
Requested by:
Senate Committee on Labor and Human Resources
House Committee on Education and Labor

REBUILDING THE FOUNDATIONS: STATE AND LOCAL PUBLIC WORKS FINANCING AND MANAGEMENT (SR), MARCH 1990
Requested by:
Senate Committee on Environment and Public Works
House Committee on Public Works and Transportation

THE USE OF INTEGRITY TESTS FOR PRE-EMPLOYMENT SCREENING (BP), SEPTEMBER 1990
Requested by:
House Committee on Education and Labor

Prior to July 1, 1990, OTA produced several categories of documents (i.e., Reports, Special Reports, Technical Memoranda, Background Papers, Case Studies, Workshop Proceedings, and Staff Papers). This list is inclusive of the various types of documents.

WORK IN PROGRESS

More than 40 projects were in progress during fiscal year 1990, in addition 12 new studies were undertaken.

This section lists the titles of assessments underway or in press, as of September 30, 1990. For a full description of these projects, please refer to the current "Assessment Activities," OTA-PC-105. This pamphlet is available from OTA by calling the Publication's Request Line (202) 224-8996.

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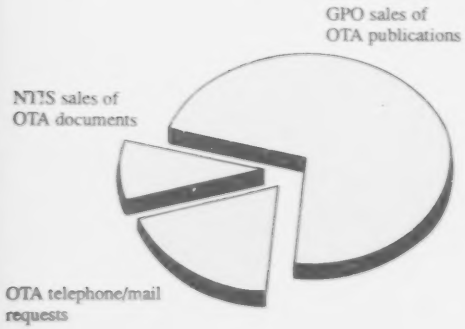
Energy and Materials Program

- Technological risks and opportunities for future U.S. energy supply and demand
- New energy technologies and developing countries
- U.S. energy efficiency: past trends and future opportunities
- Materials technology: integrating environmental goals with product design



GPO sales of OTA publications—60,799 copies
NTIS sales of OTA documents—3,121 copies

OTA telphone/mail requests—18,000

Industry, Technology, and Employment Program

- Europe 1992
- Technology opportunities for economic conversion

International Security and Commerce Program

- Technologies for START agreement
- International collaboration in defense technologies
- Use of technology in countering terrorism
- Managing the Nation's defense industrial strength in a changing security environment

HEALTH AND LIFE SCIENCES DIVISION

Biological Applications Program

- New developments in neuroscience
- Genetic monitoring & screening in the workplace
- Biotechnology in a global economy
- Policy issues in the prevention and treatment of osteoporosis

Food and Renewable Resources Program

- Beneath the bottom line: agricultural approaches to reduce agrichemical contamination of groundwater
- U.S. universities and development assistance: technical support for agriculture, natural resources, and environment
- Emerging agricultural technology: issues for the 1990s
- Renewable resource planning technologies for public land use
- Agricultural alternatives to coca production

Health Program

- Monitoring of mandated veteran studies
- Drug labeling in developing countries
- Federal response to AIDS: congressional issues
- Adolescent health
- Government policies and pharmaceutical research and development
- Evaluation of the Oregon Medicaid Proposal
- Home intravenous and immunosuppressive drug therapies under the Medicare Program
- Appointment and monitoring of the prospective payment assessment commission and the physician payment review commission

SCIENCE, INFORMATION, AND NATURAL RESOURCES DIVISION

Communication and Information Technologies Program

- Information technology and research
- Information age technology and rural economic development
- Computer software and intellectual property: meeting the challenges of technological change and global competition

Oceans and Environment Program

- Changing by degrees: steps to reduce greenhouse gases
- Complex cleanup: the environmental legacy of nuclear weapons production
- Medical waste and other "non-hazardous" solid waste issues

Science, Education, and Transportation Program

- Infrastructure technologies: rebuilding the foundations
- Basic research for the 1990s
- Schools, kids, and measurement: technologies of assessment
- New ways: tilt rotor aircraft and magnetically levitated trains

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Dr. Peterson is President of the University of Utah. He practiced medicine at the Salt Lake Clinic and taught at the LDS Hospital and University of Utah Medical School until his appointment as Dean of Admissions and Financial Aids at Harvard College. There he also served as Vice President for Alumni Affairs and Development. Dr. Peterson returned to the University of Utah in 1978 as Vice President for Health Sciences, and has served as University President since 1983.

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Dr. Lederberg, former President, is now Professor at Rockefeller University. He is the former Chairman of the Department of Genetics at Stanford University School of Medicine. He is a member of the National Academy of Sciences and is a Nobel Laureate in Physiology and Medicine.

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Mr. Halbouty is Chairman of the Board of Michel T. Halbouty Energy Co. in Houston, Texas. Prior to establishing his company, he was a chief geologist and petroleum engineer with Glenn H. McCarthy and also with Yount-Lee Oil Co.

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Dr. Harl is the Charles F. Curtiss Distinguished Professor of Economics at Iowa State University, where he has served on the faculty since 1964.

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Dr. Hunt is the chancellor of the University of Tennessee Health Science Center in Memphis. He previously served as the Dean of Medicine for the University and as Chairman of the Department of Medicine at the Mayo Clinic.

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Dr. Koffler is President and Professor of Biochemistry and Microbiology at the University of Arizona. He previously served on the faculties of the University of Massachusetts, University of Minnesota, and Purdue University.

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Dr. Ride is Director of the California Space Institute, University of California, San Diego, Scripps Institution of Oceanography. She was a fellow at the Stanford University Center for International Security and Arms Control. She is a former astronaut, and served as a member of the Presidential Commission on the Space Shuttle.

JOHN F.M. SIMS

Dr. Sims is Vice President of Marketing for Usibelli Coal Mine, Inc. He previously served as Director of the Office of Mineral Development with the Alaska Department of Commerce and Economic Development. Dr. Sims also taught Geological Engineering at the University of Alaska-Fairbanks.

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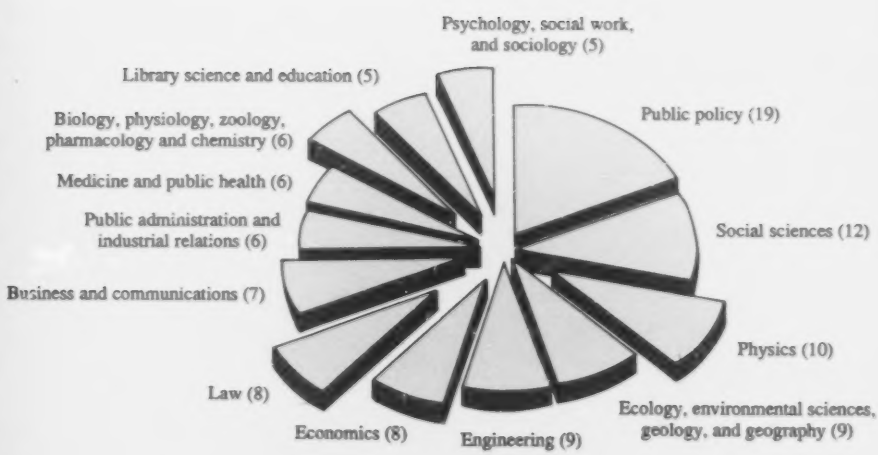
Psychology, social work, and sociology (5)
Library science and education (5)
Public policy (19)
Biology, physiology, zoology, pharmacology and chemistry (6)
Medicine and public health (6)
Public administration and industrial relations (6)
Social sciences (12)
Business and communications (7)
Physics (10)
Law (8)
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Economics (8)
Engineering (9)

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FEDERAL WORKSHOP ON TECHNOLOGIES FOR LEARNING AT A DISTANCE

CHANGING TELECOMMUNICATIONS TECHNOLOGY AND POLICY WORKSHOP

WORKSHOP ON GETTING COLLISION AVOIDANCE AIRBORNE: TCAS INSTALLATION AND FEDERAL DEADLINES

WORKSHOP ON MINORITIES IN SCIENCE AND SCIENCE POLICY

WORKSHOP ON PERFORMANCE MEASURES FOR HIGH SCHOOL VOCATIONAL EDUCATION

WORKSHOP ON ENVIRONMENTAL INFRASTRUCTURE TECHNOLOGIES: FINDING THE BALANCE BETWEEN PERFORMANCE AND REGULATION

WORKSHOP ON STATE AND LOCAL INFRASTRUCTURE MANAGEMENT AND FINANCING

WORKSHOP ON TRANSPORTATION INFRASTRUCTURE TECHNOLOGIES: SLOW MOTION PROGRESS IN A FAST FORWARD WORLD

COSTS OF RESEARCH AND FEDERAL DECISIONMAKING WORKSHOP

WORKSHOP ON EDUCATION AND TRAINING TECHNOLOGY: LEARNING FROM THE MILITARY

MATERIALS TECHNOLOGIES AND INFRASTRUCTURE DECISION MAKING WORKSHOP

Public Law 92-484
92nd Congress, H.R. 10243
October 13, 1972
An Act

To establish an Office of Technology Assessment for the Congress as an aid in the identification and consideration of existing and probable impacts of technological application; to amend the National Science Foundation Act of 1950; and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Technology Assessment Act of 1972."

Technology Assessment Act of 1972.

FINDINGS AND DECLARATION OF PURPOSE

SEC. 2. The Congress hereby finds and declares that:

(a) As technology continues to change and expand rapidly, its applications are—

(1) large and growing in scale; and

(2) increasingly extensive, pervasive, and critical in their impact, beneficial and adverse, on the natural and social environment.

(b) Therefore, it is essential that, to the fullest extent possible, the consequences of technological applications be anticipated, understood, and considered in determination of public policy on existing and emerging national problems.

(c) The Congress further finds that:

(1) the Federal agencies presently responsible directly to the Congress are not designed to provide the legislative branch with adequate and timely information, independently developed, relating to the potential impact of technological applications, and

(2) the present mechanisms of the Congress do not and are not designed to provide the legislative branch with such information.

(d) Accordingly, it is necessary for the Congress to—

(1) equip itself with new and effective means for securing competent, unbiased information concerning the physical, biological, economic, social, and political effects of such applications; and

(2) utilize this information, whenever appropriate, as one factor in the legislative assessment of matters pending before the Congress, particularly in those instances where the Federal Government may be called upon to consider support for, or management or regulation of, technological application.

ESTABLISHMENT OF THE OFFICE OF TECHNOLOGY ASSESSMENT

SEC. 3. (a) In accordance with the findings and declaration of purpose in section 2, there is hereby created the Office of Technology Assessment (hereinafter referred to as the "Office") which shall be within and responsible to the legislative branch of the Government.

Technology Assessment Board.

(b) The Office shall consist of a Technology Assessment Board (hereinafter referred to as the "Board") which shall formulate and promulgate the policies of the Office, and a Director who shall carry out such policies and administer the operations of the Office.

Duties.

(c) The basic function of the Office shall be to provide early indications of the probable beneficial and adverse impacts of the applications of technology and to develop other coordinate information which may assist the Congress. In carrying out such function, the Office shall:

(1) identify existing or probable impacts of technology or technological programs;

(2) where possible, ascertain cause-and-effect relationships;

(3) identify alternative technological methods of implementing specific programs;

(4) identify alternative programs for achieving requisite goals;

(5) make estimates and comparisons of the impacts of alternative methods and programs;

(6) present findings of completed analyses to the appropriate legislative authorities;

(7) identify areas where additional research or data collection is required to provide adequate support for the assessment and estimates described in paragraph (1) through (5) of this subsection; and

(8) undertake such additional associated activities as the appropriate authorities specified under subsection (d) may direct.

(d) Assessment activities undertaken by the Office may be initiated upon the request of:

(1) the chairman of any standing, special, or select committee of either House of the Congress, or of any joint committee of the Congress, acting for himself or at the request of the ranking minority member or a majority of the committee members;

(2) the Board; or

(3) the Director, in consultation with the Board.

Information, availability.

(e) Assessments made by the Office, including information, surveys, studies, reports, and findings related thereto, shall be made available to the initiating committee or other appropriate committees of the Congress. In addition, any such information, surveys, studies, reports, and findings produced by the Office may be made available to the public except where—

(1) to do so would violate security statutes; or

81 Stat. 54.

(2) the Board considers it necessary or advisable to withhold such information in accordance with one or more of the numbered paragraphs in section 552(b) of title 5, United States Code.

TECHNOLOGY ASSESSMENT BOARD

Membership.

SEC. 4. (a) The Board shall consist of thirteen members as follows:

(1) six Members of the Senate, appointed by the President pro tempore of the Senate, three from the majority party and three from the minority party;

(2) six Members of the House of Representatives appointed by the Speaker of the House of Representatives, three from the majority party and three from the minority party; and

(3) the Director, who shall not be a voting member.

(b) Vacancies in the membership of the Board shall not affect the power of the remaining members to execute the functions of the Board and shall be filled in the same manner as in the case of the original appointment. Vacancies.

(c) The Board shall select a chairman and a vice chairman from among its members at the beginning of each Congress. The vice chairman shall act in the place and stead of the chairman in the absence of the chairman. The chairmanship and the vice chairmanship shall alternate between the Senate and the House of Representatives with each Congress. The chairman during each even-numbered Congress shall be selected by the Members of the House of Representatives on the Board from among their number. The vice chairman during each Congress shall be chosen in the same manner from that House of Congress other than the House of Congress of which the chairman is a Member. Chairman and vice chairman.

(d) The Board is authorized to sit and act at such places and times during the sessions, recesses, and adjourned periods of Congress, and upon a vote of a majority of its members, to require by subpoena or otherwise the attendance of such witnesses and the production of such books, papers, and documents, to administer such oaths and affirmations, to take such testimony, to procure such printing and binding, and to make such expenditure, as it deems advisable. The Board may make such rules respecting its organization and procedures as it deems necessary, except that no recommendation shall be reported from the Board unless a majority of the Board assent. Subpoenas may be issued over the signature of the chairman of the Board or of any voting member designated by him or by the Board, and may be served by such person or persons as may be designated by such chairman or member. The chairman of the Board or any voting member thereof may administer oaths or affirmations to witnesses. Meetings. Subpena.

Director and deputy director

SEC. 5. (a) The Director of the Office of Technology Assessment shall be appointed by the Board and shall serve for a term of six years unless sooner removed by the Board. He shall receive basic pay at the rate provided for level III of the Executive Schedule under section 5314 of title 5, United States Code. Appointment. Compensation. 83 Stat. 863.

(b) In addition to the powers and duties vested in him by this Act, the Director shall exercise such powers and duties as may be delegated to him by the Board.

(c) The Director may appoint with the approval of the Board, a Deputy Director who shall perform such functions as the Director may prescribe and who shall be Acting Director during the absence or incapacity of the Director or in the event of a vacancy in the office of Director. The Deputy Director shall receive basic pay at the rate provided for level IV of the Executive Schedule under section 5315 of title 5, United States Code.

(d) Neither the Director nor the Deputy Director shall engage in any other business, vocation, or employment than that of serving as such Director or Deputy Director, as the case may be; nor shall the Director or Deputy Director, except with the approval of the Board, hold any office in, or act in any capacity for, any organization, agency, or institution with which the Office makes any contract or other arrangement under this Act. Employment restriction.

AUTHORITY OF THE OFFICE

SEC. 6. (a) The Office shall have the authority, within the limits of available appropriations, to do all things necessary to carry out the provisions of this Act, including, but without being limited to, the authority to—

(1) make full use of competent personnel and organizations outside the Office, public or private, and form special ad hoc task forces or make other arrangements when appropriate;

Contracts.

(2) enter into contracts or other arrangements as may be necessary for the conduct of the work of the Office with any agency or instrumentality of the United States, with any State, territory, or possession or any political subdivision thereof, or with any person, firm, association, corporation, or educational institution, with or without reimbursement, without performance or other bonds, and without regard to section 3709 of the Revised Statutes (41 U.S.C. 5);

(3) make advance, progress, and other payments which relate to technology assessment without regard to the provisions of section 3648 of the Revised Statutes (31 U.S.C. 529);

80 Stat. 499;
83 Stat. 190.

(4) accept and utilize the services of voluntary and uncompensated personnel necessary for the conduct of the work of the Office and provide transportation and subsistence as authorized by section 5703 of title 5, United States Code, for persons serving without compensation;

(5) acquire by purchase, lease, loan, or gift, and hold and dispose of by sale, lease, or loan, real and personal property of all kinds necessary for or resulting from the exercise of authority granted by this Act; and

(6) prescribe such rules and regulations as it deems necessary governing the operation and organization of the Office.

Recordkeeping.

(b) Contractors and other parties entering into contracts and other arrangements under this section which involve costs to the Government shall maintain such books and related records as will facilitate an effective audit in such detail and in such manner as shall be prescribed by the Office, and such books and records (and related documents and papers) shall be available to the Office and the Comptroller General of the United States, or any of their duly authorized representatives, for the purpose of audit and examination.

(c) The Office, in carrying out the provisions of this Act, shall not, itself, operate any laboratories, pilot plants, or test facilities.

Agency cooperation.

(d) The Office is authorized to secure directly from any executive department or agency information, suggestions, estimates, statistics, and technical assistance for the purpose of carrying out its functions under this Act. Each such executive department or agency shall furnish the information, suggestions, estimates, statistics, and technical assistance directly to the Office upon its request.

Personnel detail.

(e) On request of the Office, the head of any executive department or agency may detail, with or without reimbursement, any of its personnel to assist the Office in carrying out its functions under this Act.

(f) The Director shall, in accordance with such policies as the Board shall prescribe, appoint and fix the compensation of such personnel as may be necessary to carry out the provisions of this Act.

ESTABLISHMENT OF THE TECHNOLOGY ASSESSMENT ADVISORY COUNCIL

Membership.

SEC. 7. (a) The Office shall establish a Technology Assessment Advisory Council (hereinafter referred to as the "Council"). The Council shall be composed of the following twelve members:

(1) ten members from the public, to be appointed by the Board; who shall be persons eminent in one or more fields of the physical, biological, or social sciences or engineering or experienced in the administration of technological activities, or who may be judged qualified on the basis of contributions made to educational or public activities;

(2) the Comptroller General; and

(3) the Director of the Congressional Research Service of the Library of Congress.

Duties.

(b) The Council, upon request by the Board, shall—

(1) review and make recommendations to the Board on activities undertaken by the Office or on the initiation thereof in accordance with section 3(d);

(2) review and make recommendations to the Board on the findings of any assessment made by or for the Office; and

(3) undertake such additional related taks as the Board may direct.

Chairman and Vice Chairman

(c) The Council, by majority vote, shall elect from its members appointed under subsection (a)(1) of this section a Chairman and a Vice Chairman, who shall serve for such time and under such conditions as the Council may prescribe. In the absence of the Chairman, or in the event of his incapacity, the Vice Chairman shall act as Chairman.

Term of office.

(d) The term of office of each member of the Council appointed under subsection (a)(1) shall be four years except that any such member appointed to fill a vacancy occurring prior to the expiration of the term for which his predecessor was appointed shall be appointed for the remainder of such term. No person shall be appointed a member of the Council under subsection (a)(1) more than twice. Terms of the members appointed under subsection (a)(1) shall be staggered so as to establish a rotating membership according to such method as the Board may devise.

Travel expense.

80 Stat. 498; 83 Stat. 190. 5 USC 5701.

(e)(1) The members of the Council other than those appointed under subsection (a)(1) shall receive no pay for their services as members of the Council, but shall be allowed necessary travel expenses (or, in the alternative, mileage for use of privately owned vehicles and per diem in lieu of subsistence at not to exceed the rate prescribed in sections 5702 and 5704 of title 5, United States Code), and other necessary expenses incurred by them in the performance of duties vested in the Council, without regard to the provisions of subchapter 1 of chapter 57 and section 5731 of title 5, United States Code, and regulations promulgated thereunder.

Compensation.

(2) The members of the Council appointed under subsection (a)(1) shall receive compensation for each day engaged in the actual performance of duties vested in the Council at rates of pay not in excess of the daily equivalent of the highest rate of basic pay set forth in the General Schedule of section 5332(a) of title 5, United States Code, and in addition shall be reimbursed for travel, subsistence, and other necessary expenses in the manner provided for other members of the Council under paragraph (1) of this subsection.

Utilization of the Library of Congress

SEC. 8. (a) To carry out the objectives of this Act, the Librarian of Congress is authorized to make available to the Office such services and assistance of the Congressional Research Service as may be appropriate and feasible.

(b) Such services and assistance made available to the Office shall include, but not be limited to, all of the services and assistance which the Congressional Reserch Service is otherwise authorized to provide to the Congress.

(c) Nothing in this section shall alter or modify any services or responsibilities, other than those performed for the Office, which the Congressional Research Service under law performs for or on behalf of the Congress. The Librarian is, however, authorized to establish within the Congressional Research Service such additional divisions, groups, or other organizational entities as may be necessary to carry out the purpose of this Act.

(d) Services and assistance made available to the Office by the Congressional Research Service in accordance with this section may be provided with or without reimbursement from funds of the Office, as agreed upon by the Board and the Librarian of Congress.

Utilization of the General Accounting Office

SEC. 9. (a) Financial and administrative services (including those related to budgeting, accounting, financial reporting, personnel, and procurement) and such other services as may be appropriate shall be provided the Office by the General Accounting Office.

(b) Such services and assistance to the Office shall include, but not be limited to, all of the services and assistance which the General Accounting Office is otherwise authorized to provide to the Congress.

(c) Nothing in this section shall alter or modify any services or responsibilities, other than those performed for the Office, which the General Accounting Office under law performs for or on behalf of the Congress.

(d) Services and assistance made available to the Office by the General Accounting Office in accordance with this section may be provided with or without reimbursement from funds of the Office, as agreed upon by the Board and the Comptroller General.

Coordination with the National Science Foundation

Scientific programs, financing. 92 Stat. 360.

SEC. 10. (a) The Office shall maintain a continuing liaison with the National Science Foundation with respect to—

(1) grants and contracts formulated or activated by the Foundation which are for purpose of technology assessment; and

(2) the promotion of coordination in areas of technology assessment, and the avoidance of unnecessary duplication or overlapping of research activities in the development of technology assessment techniques and programs.

(b) Section 3(b) of the National Science Foundation Act of 1950, as amended (42 U.S.C. 1862(b)), is amended to read as follows:

"(b) The Foundation is authorized to initiate and support specific scientific activities in connection with matters relating to international cooperation, national security, and the effects of scientific applications upon society by making contracts or other arrangements (including grants, loans, and other forms of assistance) for the conduct of such activities. When initiated or supported pursuant to requests made by any other Federal department

or agency, including the Office of Technology Assessment, such activities shall be financed whenever feasible from funds transferred to the Foundation by the requesting official as provided in section 14(g), and any such activities shall be unclassified and shall be identified by the Foundation as being undertaken at the request of the appropriate official."

64 Stat. 156; 32 Stat. 365. 42 USC 1873.

ANNUAL REPORT

SEC. 11. The Office shall submit to the Congress an annual report which shall include, but not be limited to an evaluation of technology assessment techniques and identification, insofar as may be feasible, of technological areas and programs requiring future analysis. Such report shall be submitted not later than March 15 of each year.

APPROPRIATIONS

SEC. 12. (a) To enable the Office to carry out its powers and duties, there is hereby authorized to be appropriated to the Office, out of any money in the Treasury not otherwise appropriated, not to exceed $5,000,000 in the aggregate for the two fiscal years ending June 30, 1973, and June 30, 1974, and thereafter such sums as may be necessary.

(b) Appropriations made pursuant to the authority provided in subsection (a) shall remain available for obligation, for expenditure, or for obligation and expenditure for such period or periods as may be specified in the Act making such appropriations.

Approved October 13, 1972.

LEGISLATIVE HISTORY:

HOUSE REPORTS: No. 92-469 (Comm. on Science and Astronautics) and
No. 92-1436 (Comm. of Conference).

SENATE REPORT No. 92-1123 (Comm. on Rules and Administration).

CONGRESSIONAL RECORD, Vol. 118 (1972):

Feb. 8, considered and passed House.

Sept. 14, considered and passed Senate, amended.

Sept. 22, Senate agreed to conference report.

Oct. 4, House agreed to conference report.

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